

Indicator 21. Area and Percent of Forest Land with Significantly Diminished Soil Organic Matter and/or Changes in Other Soil Chemical Properties

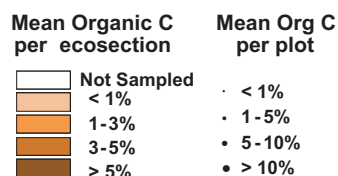
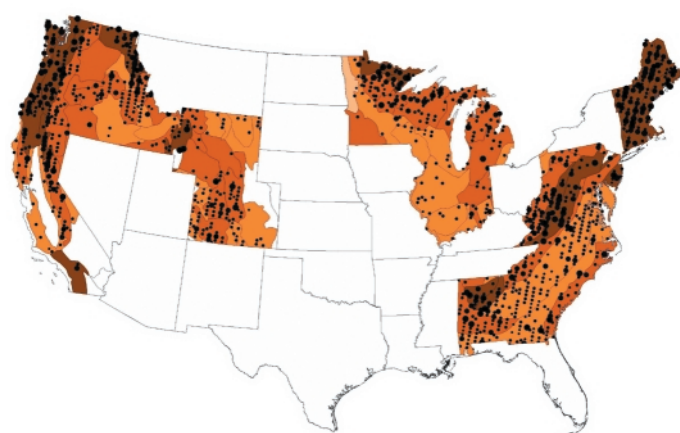


Figure 21-1. Percent of organic carbon in upper mineral soil layers measured on forest health monitoring plots (1998–1999).

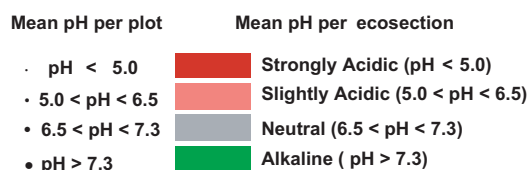
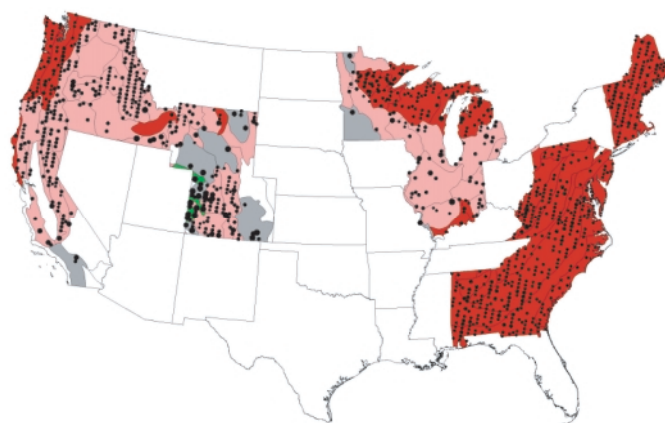


Figure 21-2. Water pH in upper mineral soil layers measured on forest health monitoring plots (1998–1999).

What Is the Indicator and Why Is It Important?

Forest productivity may be adversely affected by changes in soil chemical properties following disturbances or certain management practices. The goal of this indicator is to quantify changes in soil chemical variables relative to long-term average values that may be sufficient to negatively affect soil fertility and site productivity. Soil organic matter (SOM) and pH were selected as indicators because they function as key regulators of soil chemical, biological, and physical processes.

What Does the Indicator Show?

Monitoring of forest soils is relatively new, and little is known about historical values for soil properties in undisturbed forest ecosystems. As a result, this report focuses primarily on documenting the current distribution of SOM and pH. Data from the NRCS STATSGO (Natural Resources Conservation Service State Soil Geographic) database indicates that the lowest concentrations of SOM are expected in regions where high rates of decomposition are promoted by environmental or chemical variables, such as

temperature, moisture, or pH. Nationally, 3.8 percent of woodland soils have a mean SOM concentration of less than 1 percent by weight. More than 95 percent of those low SOM soils were located in the Rocky Mountain and Southern Resources Planning Act (RPA) regions. Across all regions, 18 percent of woodland soils were characterized as strongly acidic (pH ≤ 5.0). Although the STATSGO designation of woodland soils differs from definitions used in the Forest Inventory and Analysis (FIA) program, and care must be taken in comparing data from these two sources, these geographic trends are supported by initial data from the Forest Health Monitoring (FHM) program in 1998–1999 (Conkling et al., in press). The effect of a reduction in SOM or an increase in acidity on site productivity, as well as the degree of change that is tolerable, varies for different soil and vegetation types. Once baseline levels have been established, interpretation of trends should be made within the context of specific forest type-soil associations. When fully implemented, the FIA soil data will provide critical information on changes in the chemical status of forest soils for use in future reporting efforts.